

Apple Fruit as a Source of Health Beneficial Compounds

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Editorial

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Editorial

Fruits are well known for their high value in human health. Epidemiological studies indicate that consumption of fruits, vegetables and their products are inversely related to carcinogenesis, coronary heart disease, mortality, and aging processes [1]. It has been suggested that this reduction is not only due to increased levels of vitamins and fibers, but that other compounds, such as phenolic compounds, also appear to play an important role in the overall antioxidant capacity of fruits and vegetables [1]. It is clear from the fact that there has been recorded a substantial increase in heart and vascular diseases, obesity, cancer and also diabetes due to less fruit intake in food [2]. The antioxidant properties of phenolic compounds present in plant food may contribute to these health beneficial effects [3]. These secondary metabolites, which occur abundantly in plant foods, have been discovered to be beneficial components of functional food [4]. Their positive effects on human health were first proposed by Bentsáth (1936) [5] and are now widely accepted. Plant phenolic compounds are well recognized for their antioxidative activities and apple is well known for its high levels of these compounds. They scavenge free radicals, thus breaking the free radical chain reaction of lipid peroxidation [6]. "An apple a day keeps the doctor away". This saying has encouraged many researchers to search for the "magic" ingredients of apple. Apple possesses many health beneficial properties for human being as a rich source of phenolic compounds. Cultivated apple is one of the most important cultivated fruit species. It belongs to the family Rosaceae and sub-family Maloideae that includes many commercial fruit species such as pear, strawberry, cherry, peach, apricot, almond and black cherry [7]. It is the main fruit crop of temperate regions of the world and is produced commercially in 91

countries with a total production of 64 million tons. It has been associated with lowering the risks of cancers, particularly prostate, liver, colon, and lung cancers cardiovascular diseases, coronary heart diseases, asthma, type-2 diabetes, thrombotic stroke, and ischemic heart disease [8-10].

Phenolic compounds are an important part of the human diet and have great importance in the nutritional and commercial properties of agricultural foodstuffs. Phenolic compounds comprise one of the largest and most ubiquitous groups of plant metabolites. Some of the major phenolic compounds isolated and identified from apple are chlorogenic acid, hydroxycinnamic acid, epicatechin, catechin, gallacatechin, procyanidins, phloretin-glucosides, quercetin glycosides, and dihydrochalcone glycosides [4]. The most commonly occurring ones in foods are flavonoids and phenolic acids. The diversity of the chemical structures and variability in foods make calculation of the phenolic content difficult. For example, the average intake of flavonols and flavones was estimated as 23 mg/day [6]. Phenolic content of plant food is currently considered a measure of product quality [6]. The content of phenolic compounds varies in different plant species and even from tissue to tissue within the same plant species. For instance, Lata, [11] measured the average phenolic content in 53 different apple cultivars in two successive growing years 2003 and 2004. The average phenolic content for different cultivars was 777-1842 ug/g in year 2003 and 476-2349 ug/g in 2004. In another study by Lata, [12] phenolics for whole fruit was found to be 1600-4600 ug/g. They found that the total phenolics in peel were three times higher than in flesh [12]. Van der Sluis, et al. [13] also found that flavonoids

are not equally distributed throughout the apple. For instance, quercetin glycosides are almost exclusively found in peel and have very low concentration in flesh. Phloridzin was found both in peel and flesh. Mcghie et al. [10] found on average 46% of the phenolic compounds of apple in the peel and determined that flavanols contents were higher in flesh than in peel. Like Van der Sluis, et al. [13], Mcghie, et al. [10] also observed that phloridzin was present both in peel and flesh as well as procyanidins. Chlorogenic acid was more in flesh (80-85%) whereas anthocyanins only were determined (100%) in peel [10]. The knowledge of these beneficial phenolic compounds in apple could incline the consumer for more fruit consumption because of improved health values.

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